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ABSTRACT

This is the final report of the Student National Medical Association's tutorial and preparatory program aimed at increasing enrollment of minority students in medical schools. The first of six sections describes the program's activities in preparing minority students to take the New Medical College Admissions Test (MCAT). The original proposal and actual developments during the program's first three years are detailed. Evaluation criteria and the evolution of the program are briefly outlined. Underrepresentation of minority groups in medical colleges, due in large part to low MCAT scores, is documented in the second section, which expands on the program's purpose. The third section describes the background of the project, which originally ran for two years in the Washington, District of Columbia area, and focused on black students. Its later expansion to include New York City, where most of the students were Hispanic, is also outlined. The fourth section contains a description of changes in the project's structure, content, and conduct over its first three years. Student needs, curriculum, and means used to disseminate the program's major components to other institutions are explained. The fifth section discusses outcomes and impacts. Data are presented showing that program participants have scores almost the same as those of minority students who were accepted into medical school for the year 1983-84. The sixth and final section summarizes this report and asserts that the program's basic elements are effective and flexible enough to be readily replicable in other institutions. Appendix A consists of the formative evaluation of the project's third year, Appendix B of publicity and recruitment materials utilized, and Appendix C of instruments used to collect data from participating students and their tutors. (KH)

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INCREASING MINORITY ADMISSION TO MEDICAL SCHOOL

Final Report

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INCREASING MINORITY ADMISSION TO MEDICAL SCHOOL

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A. Project Overview

On August 15, 1980, the Student National Medical Association (SNMA) received a three year FIPSE grant of $295,255 to design and conduct a tutorial and preparatory program aimed at increasing enrollment of minority students in medical schools. The focus of the tutorial program was the preparation of minority students to take the New Medical College Admissions Test (MCAT). The program's five basic components may be readily transferred to other settings and it is flexible enough to adapt to the constraints of time, resources and setting. The program's effectiveness has been evaluated and it has been disseminated to other institutions.

B. Purpose

The long-term goal of the project was to increase minority participation in medical education by removing one of the biggest barriers to this underparticipation--low MCAT scores. A more immediate goal was to develop a tutorial program (one component of which would be a diagnostic test, the PMSAT) that would, within a relatively short time, help less than competitive minority premedical students to achieve competitive scores on the New MCAT. The project came into being because the grantee felt that the traditionally low minority MCAT scores posed a serious barrier to minority admission to medical school and that one of the most effective means of increasing minority participation was to assist minority premedical students to overcome this barrier. Such a program would also be capable of replication at other institutions.

C. Background and Origins

The project was originally planned as a review course to bolster student skills in MCAT content areas. The grantee, especially as the project progressed, came to feel that there were a considerable number of minority students who, although not competitive, had the potential to become so within a short time. The program, therefore, rather than the review course originally planned, evolved into a system that combined diagnostic assessment, individual need profiles, remediation and practice testing, with a heavy emphasis on test-taking and study skills. Much emphasis was also placed on teacher training since a well-prepared, dedicated instructor was considered the most vital element in such a program.

The program operated at two sites: Washington, D. C. and New York City. In Washington, the program was housed in the EPRI office and focused on Black students from area universities and colleges. In New York City, the program established a working relationship with Aspira, a Puerto Rican community-based organization, and focused on Mainland Puerto Rican students from New York and New Jersey.

D. Project Description

After the project's first year, when the grantee was the Student National Medical Association, the structure, content and conduct of the program was substantially altered in response to the recommendations of participants in an evaluation conference held at the end of that year. During the second and third years, the project was run by EPRI, and all changes recommended at the evaluation conference were incorporated into the program plan. The second year, then, was essentially the testing period for the very radical changes introduced at the close of Year One.

These changes involved extending services to all schools in the Washington metropolitan area, restructuring the program into two phases--one eight-week period in spring when classes in reading, quantitative skills and problem-solving were held during all-day Saturday sessions; and an intensive eight-week period in the summer which covered all MCAT content areas and operated six hours per day, five days per week.

During the third year the project expanded to an additional site--New York City--where the focus was on Mainland Puerto Rican students from New York and New Jersey. An effort was made to increase the numbers of students served and to refine techniques for integrating the teaching of the science courses with one another and with problem solving and quantitative analysis (both major recommendations of the second year evaluation). As a result, the number of students served at the Washington site more than doubled and the number at the New York site met our self-imposed goal. Integration of courses was much improved in the third year and resulted in timely pinpointing of gaps in students' knowledge of basic skills so that remediation could be applied.

Also, during the third year, FIPSE-funded dissemination workshops were developed so that the major components of the program could be synthesized and presented to other institutions during a two-day workshop. The flexibility of these basic components was emphasized and suggestions given as to how the basic program might be adapted to the particular situations of other institutions.

The study concluded that students who could be considered "non-competitive" in terms of their performance on the PMSAT could, after participating in an intervention program, achieve MCAT scores close to the national average for minority acceptees.

E. Outcomes and Impacts

The goal of the project was to develop and conduct an intervention program capable of being replicated elsewhere, that would prepare minority premedical students to achieve competitive scores on the New MCAT. A comparison of mean MCAT scores of participants over a two-year period and those of minority acceptees to medical school show no significant differences across all subject areas. Thus, on an average, participants in our program have scored as well as minority students who were accepted into medical school for the year 1983-84.

F. Summary and Conclusions

Underrepresentation of minorities in medical education persists in spite of efforts to increase their participation. One of the major barriers to minority admission to medical school is the fact that minorities tend to have low scores on the New Medical College Admissions Test (New MCAT). This project developed and conducted a tutorial program to increase minority scores on the New MCAT by improving student test-taking skills, identifying and correcting student weaknesses in MCAT subject areas, and exposing students to MCAT item types and test-taking conditions.

FIPSE funding of this project has resulted in an intervention program aimed at increasing minority scores on the New MCAT which focuses on the student who, although not competitive to begin with, has the potential to improve his/her skills within a relatively short period of time. The program's basic elements are readily replicable in other settings and the program design is flexible enough to conform to the constraints of time, resources and setting.

INCREASING MINORITY ADMISSION TO MEDICAL SCHOOL

FINAL REPORT

Project Overview

The Original Proposal

Beginning August 15, 1980, the Student National Medical Association (SNMA) received a three year FIPSE grant of $295,255 to design and conduct a tutorial and preparatory program aimed at increasing enrollment of minority students in medical schools. The project proposed to address one of the greatest barriers to medical school admission for minorities, the New Medical College Admission Test (New MCAT), by:

- o improving minority student performance on the New MCAT
- o increasing student knowledge of tests and test-taking strategies
- o developing a tutorial curriculum capable of national application that would be tailored to minority student needs in the skills necessary for high performance on the New MCAT.

The activities to be undertaken as a means of accomplishing the above were:

- o identifying minority premedical students
- o administering a diagnostic test, the Premedical Student Achievement Test (PMSAT), to assess student weaknesses in MCAT content areas
- o developing individual student need profiles and tutorial modules
- o training instructional staff and counselors
- o delivering test content and test construction instruction, as well as, study and test-taking techniques to support the development of learning and test-taking skills
- o evaluating, analyzing and disseminating the project results.

The first year, the focus was to be on minority students in the District of Columbia colleges and universities. The second year, the project was to expand to include students at predominantly Black institutions in the Atlanta area. The third year, Hispanic students in Houston were to have been included.

Education Policy Research Institute (EPRI) of Educational Testing Service was to be the evaluator of the program and was to work closely with SNMA at all stages of the project. However, in April 1982, well into the second year of the project, the grant was transferred from the SNMA to EPRI. Description of the first year, therefore, may not be as complete as that for the two succeeding years due to absence of pertinent records regarding activities for that year.

Year One

Sixty-three students applied to the program, forty-three of whom took the PMSAT. Although the original proposal suggested certain criteria for selection of participants, none, in fact, were used. All students who applied to the program were accepted regardless of science background or math or reading skills.

The PMSAT was administered to applicants two days before the intervention program began. This created difficulty because of delays in score reporting. In addition, there were no opportunities for staff or tutors to learn about the students' abilities prior to the beginning of the intervention program.

Other significant departures from the proposed format included the following:

- o study skills and test-taking techniques were not included in teacher training sessions
- o the tutorial program ran for slightly under seven weeks instead of the proposed twelve due to difficulties in locating space for the program and problems related to mid-year break and spring recess.
- o no study skills or test-taking sections were included in the tutorials.

Tutors for the program were recruited from neighboring graduate and professional schools. Ten tutors were selected including one physician, one medical student and eight Ph.D. candidates. Two counselors from the Howard University Counseling Center were also employed to advise students concerning course work necessary for medical school, medical school application procedures and, if necessary, alternative career choices.

As a result of the evaluations conducted by EPRI at the close of Year One, several areas of weakness were identified by both tutors and students. These included the length of the program, which was thought to be insufficient; student selection and preparedness (many of the students participating did not require a tutorial program but rather a full blown

remediation program); poor program planning and administration typified by administration of the diagnostic test two days before the start of the tutorial program; and program content (test-taking and study skills should have been part of the curriculum).

In order to discuss the findings of the first year evaluation and to plan the program for the second year, an evaluation meeting was held in the Fall of 1981 with project staff and consultants from Howard University and Georgetown who had extensive experience in running intervention programs. Two major recommendations emerged from that meeting:

- o criteria for student selection must be developed and adhered to
- o the program should be restructured into two phases: Phase One--student assessment and preparation conducted during the spring semester; and Phase Two--intensive tutorial program, conducted during the summer.

The observations made by tutors, students and staff during Year One, as well as the recommendations given by participants at the evaluation meeting, resulted in several important changes in Year Two. Furthermore, the project director resigned and was replaced by a new project director.

Year Two

It was felt that because of the many changes required in the format of the program as well as changes in staff and grantee, that the original plan of expanding the program to include predominantly Black schools in the Atlanta area would have to be abandoned. The resulting changes are described in detail in the "Project Description" section of this report.

In spite of there being nearly a five-month period during which funds were not released, the project remained on schedule due to EPRI's and the new project director's donation of time and resources to the program activities. In the negotiations that took place among FIPSE, SNMA and ETS, the FIPSE program officer was extremely helpful and provided valuable guidance during the transition period.

The PMSAT was administered on three dates in November and December 1981 to sixty-three premedical students from the District of Columbia area colleges and universities. By the end of January the test scores had been analyzed and diagnostic evaluations made regarding student needs. Students were then counseled individually, their scores explained and the intervention program described. Approximately forty students registered for Phase One of the program; of these, twenty-four attended regularly. Thirty students registered for Phase Two: of these, eleven attended regularly.

In April 1982, EPRI formally assumed responsibility for the project, with the stipulation that an advisory board consisting of representatives of SNMA, ETS, and other entities be convened, that the project director be retained on the project, and that the project be conducted according to the original goals of the proposal. Accordingly, in September 1982, the Advisory Board met. The project was described, evaluation results, problem areas and plans for dissemination were discussed. This meeting, together with the final tutor workshop held in August 1982 and the tutors' and students' evaluations, led to the following recommendations for Year Three of the project:

- o increase the number of students served
- o work with basic science teachers to establish the necessary breadth and depth of material to be covered in each content area
- o encourage tutors to bridge their content area with those of other subject areas.

Year Three

Year Three saw the expansion of the project to another site: New York City. The target group there were Mainland Puerto Ricans, another underrepresented minority in medical education. The program in New York was hosted by Aspira, the largest Puerto Rican community-based organization in the United States. Students participating in the program were identified by Aspira. Most of them were part of the Aspira of New York and the Aspira of New Jersey membership.

In accordance with the recommendation of all evaluators, recruitment activity in the Washington, D. C. area was increased and resulted in doubling the number of participants. In Washington, D. C. there were four test administrations. One hundred fifteen students took the PMSAT. Sixty students registered for Phase One, with fifty attending regularly. Of the forty-nine students who registered for Phase Two thirty-five attended regularly.

In New York, seventy-five students took the PMSAT; thirty-five registered for Phase One and twenty-seven attended regularly. In Phase Two, thirty-one students registered, of whom twenty-six participated regularly.

Results and Dissemination

The program results are competitive MCAT scores for the average program participant as well as an intervention program that is capable of being replicated in a variety of settings.

The receipt of a FIPSE dissemination grant made possible the development of two-day workshops to share the basic components of the program with other institutions. We have since been contacted to provide technical assistance to many of the workshop participants.

Purpose

Statement of the Problem

In 1970 the Association of American Medical Colleges (AAMC) formally recognized the need to enhance minority participation in medical education when it established the goal of increasing minority medical student enrollment to 12 percent of the student population by 1975 (AAMC, 1970). At that time only 2.8 percent of all medical students were minorities and most Black students were attending historically Black medical schools (Cadbury and Cadbury, 1979). Today, some thirteen years later, a major problem still confronting premedical student educators is the failure of many minority students to qualify for medical school admission.

The need for more minority physicians is readily apparent. A 1981 study by the National Academy of Sciences found that minorities often need more health care than their nonminority counterparts as evidenced by the disparities in the health status between these groups. Problems of maldistribution and fragmentation of services in those areas largely inhabited by racial and ethnic minorities compound these disparities (NAS, 1981). The Department of Health and Human Services in 1982 estimated that an additional 27,560 Black physicians were needed in 1980 to reach parity in supply and to comprise a proportion of total practitioners equal to the representation of Black persons in the total population (DHHS, 1982). Although the Graduate Medical Education National Advisory Committee (GMENAC) recommended an overall 17 percent decrease in medical school enrollment compared to the 1981 level, it called for expanded efforts to increase the number of minorities in medical school (GMENAC, 1981).

Despite this apparent need for more minority physicians and efforts to identify, recruit and retain underrepresented minorities[1] the implementation of enrichment programs and the establishment of minority affairs offices in medical schools, minority participation in medical education has not substantially increased. In fact, in recent years there is evidence that minority access to medical education is declining. In 1974-75 Black first-year students comprised 7.5 percent of all first-year students; by 1982-83 the proportion of Blacks in first-year classes had decreased to 5.8 percent (AAMC, 1983). Not only has the proportion of Black first-year students decreased, but their overall acceptance rate

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[1] The Association of American Medical Colleges defines underrepresented minorities as Black American, Mexican Americans, Native Americans and Mainland Puerto Ricans.

has dropped appreciably in recent years. In 1973, 48.1 percent of Black medical school applicants were accepted (Baratz and Fenton, 1981) compared to the Black applicant acceptance rate of 38.5 percent in 1983 (AAMC, 1983). If the Black acceptance rate were calculated excluding the three historically Black medical schools--Howard, Meharry and Morehouse--which accept 19.6 percent of Black students (JAMA Sept. 23/30, 1983), the low Black acceptance rate would be even more striking.

A similar underrepresentation is found in data on other minorities. Applications for Mainland Puerto Ricans increased 15 percent between 1974-75 and 1982-83, yet their proportion of first-year students has essentially remained at 0.6 percent. American Indians comprised 0.3 percent of first-year students in 1973-74 as well as ten years later. Mexican Americans were 1.2 percent of first-year students in 1972-73 and 1.6 percent in 1982-83 (AAMC, 1983. JAMA Sept. 23/30, 1983).

Several explanations have been offered for this low minority participation rate. Among these are: the marginal increase in the absolute number of minority applicants (Gordon, 1979); the spiraling costs of medical education (AAMC, 1982); the siphoning off of many promising students by competing opportunities in engineering, law, business and other professions; the reluctance of admissions committees to relax traditional entrance requirements in this post-Bakke era; and the removal of medical college incentives for increasing minority enrollment through federal capitation grants (Morris, 1979). Explanations more closely related to the academic background of minorities include their lower grade point averages, poor counseling, and lack of information about the admissions process.

Minority medical educators and premedical students perceive the New MCAT as a major barrier to increasing minority participation in medical education. Because the MCAT is required by all medical schools in the United States and Canada, successful performance on this examination is often viewed as a "rite of passage." Historically, minorities have received relatively lower scores on the MCAT than have non-minorities. As a result, not only must the number of minority medical applicants increase, but also their academic skills must be improved if they are to be successful in gaining admission to medical school. Data examining the mean MCAT scores of accepted minority and nonminority applicants reveal dramatic disparities. Accepted minority students score lower on the MCAT than nonminorities, have lower science GPA's, and are less knowledgeable about medical education and potential medical careers (Baratz and Keyser-Smith, 1982).

Clearly, a need exists for intervention programs that seek to correct the academic deficiencies of minority premedical students. Surveys of administrators of intervention programs reveal an almost unanimous opinion that these programs can improve students' chances of admission, increase students' familiarity with test construction, identify student weaknesses, and help reduce test-taking anxiety (Baratz and Keyser-Smith). Furthermore,

the AAMC brief on Bakke vs. California Board of Regents indicated the need for special intervention programs to assure continued minority enrollment in U. S. medical schools (AAMC, 1974).

Our Understanding of the Problem

The genesis of the project was our realization of the need for developing a program that would provide intervention to minority premedical students in preparing for the New Medical College Admissions Test (MCAT), one of the major barriers to minority admission into medical school. After two years of involvement in such a program, our own perception of the problem has deepened. The following section is a discussion of the issues we feel are involved in the consideration of just one aspect of the problem of underrepresentation of minorities in the medical profession--the role of the MCAT in deterring minorities from entering medical school.

As noted above, low MCAT scores represent one of the greatest barriers to minority admission to medical school. Although the number of minority applicants has increased in recent years, the acceptance rates for minorities have declined. Reasons for this decline in acceptance rates include the fact that even though minority scores on the MCAT have been increasing, nonminority scores have been increasing at an even faster pace. This phenomenon, occurring in a post-Bakke era of neo-conservatism and anti-affirmative action sentiment, and coupled with the prediction of an oversupply of physicians, does not bode well for increasing the number of minorities in the medical profession. There are three ways of addressing this problem:

1. Increase the size of the applicant pool by attracting competitive minority students who might not have considered entering the health professions. This approach is implemented through high school prep programs, science and health career fairs, special recruitment programs, etc. The fact is, however, that many talented minority students are opting for other professions such as engineering, business and law which do not require as large an investment in time and dollars.

2. Relax admissions policies so that the lower MCAT scores formerly considered competitive for minority applicants still prevail regardless of an increase in nonminority scores. It is highly unlikely that this approach would be successful, especially after Bakke.

3. Improve minority qualifications--GPA, MCAT scores, etc.--to increase minority competitiveness. This is, we feel, the ideal solution in that it increases the number of minority students in the applicant pool who can be considered competitive. This approach presupposes, of course, that there is a large number of minority students in the applicant pool whose qualifications can be improved in a short time. We feel this to be true based on our own experience.

It is our contention that the surface of the applicant pool contains those students who are highly qualified and competitive and who need very little in the way of intervention or remediation. Unfortunately, many programs, as a means of ensuring their success, set their criteria so high that only these students qualify. This is known as "creaming" and, we feel, does not adequately address the problem of low minority participation in medical education.

Just below the surface and farther down, there are students who may have the potential to improve their skills in a short time, given intervention or remediation as well as special counseling and other services. If one wishes to improve MCAT scores for such students, more than a review course is necessary. Such a student may have gaps in knowledge and weaknesses in basic skills--not to mention study and test-taking skills--that he/she could learn given a good intervention program. In working with such students it is important to identify the minimum skills that are necessary to allow for improvement within a short time. In other words, given limitations of time and other resources, how deep into the pool can one go before improvement becomes unlikely? It is only through constant trial and error that programs like these can establish cut-off points.

When we first began our project, we felt that all that was needed was a review of MCAT subject areas (the original design did not include reading or problem solving courses). We soon found that what most of our students required was remediation in all subject areas as well as instruction in test-taking and study skills, but that when this was provided they could improve their scores on the MCAT.

What was needed, then, was a program specially designed to fill in the gaps in students' knowledge and instructors specially trained to effectively identify and deal with such gaps. Our physics instructor, for example, became aware that many students were not able to complete physics problems because they lacked the requisite mathematical knowledge to compute the problem, not because they were unable to apply principles of physics to the problem. A three-hour brush-up course in those mathematical skills required for physics helped to improve the physics scores. Constant attention, therefore, on an individual basis to the specific needs of students is essential.

In a discussion of students who possess the requisite minimum basic skills to improve their qualifications for medical school within a relatively short time, the question always arises regarding how to treat those who do not. It has been our experience that this group of students often has unrealistic expectations of getting into medical school and quite incorrect perceptions of what is required to qualify. Students in this category should be counseled regarding other health professions and dissuaded from making repeated attempts to overcome what are to them the insurmountable barriers to achieving their goal.

Background

The project ran for two years in the Washington, D. C. area and was focused on Black students from area colleges and universities. The third year, in addition to enrolling Washington area students, it expanded to a second site, New York City, where most of the students were Hispanic. Separate descriptions of both sites are in order since they involved different circumstances and settings.

Washington, D. C.

Education Policy Research Institute (EPRI) of Educational Testing Service (ETS) was the grantee for the last two years of the project. A policy analysis branch of ETS, EPRI was located in the Washington Office of ETS and employed a staff of approximately twenty employees. EPRI had been involved in very few action projects before this, but had produced several studies on minority graduate and professional education, including medical education. EPRI's involvement with the project the first year was as evaluator; the second year the grant was transferred to this institution.

It is unusual for a program such as this to be housed in a non-university setting. The benefits that we perceived are the following:

- Participants were recruited from all the area institutions, thus resulting in a better "mix" of students
- Instructors could be hired from various institutions--there was a greater variety of candidates to choose from
- Students seemed to be less competitive and much more helpful towards one another away from an academic setting
- Students seemed to be more willing to approach instructors for help, to stay after class to talk with instructors, and to study together in groups

The advantages of running a program such as this in an academic setting are:

- Less effort and resources can be expended on recruitment activities
- Housing the program on campus would make it more accessible to students attending that institution
- There are more support services available, such as reading labs, counseling centers, libraries

- The program can be integrated into other related activities, such as premedical counseling, workshops on the applications process, medical school recruitment activities, etc. (This is particularly true if the institution contains a medical school.)

We also felt that the addition of the following services contributed significantly to the effectiveness of the program and in some instances helped to overcome some of the disadvantages of not being attached to an academic institution.

- A counseling component to aid students not only in test score interpretation but in the applications process, financial aid, choice of medical school, requirements for admission. (As part of this service we collected catalogues from all the medical schools as well as AAMC publications on medical schools and minority programs.)

- An information dissemination service that consisted of the collection, reproduction and distribution of articles, brochures, and other literature on topics involving medical school, the admissions process, financial aid, and medical education in general

- A weekly lecture by an expert on some aspect of medical education

- Instruction and practice in writing the essay required in the medical school application process

- A relaxation workshop just prior to the test to help students learn to deal with test-related stress

- An English as a Second Language (ESL) class oriented towards the familiarization of students with the interview process and essay development. (This was for Hispanic students in New York City.)

- A simulated medical school admissions exercise

- A simulated admissions interview exercise

Many of the above services were provided free of charge to us by instructors, medical school personnel, and others; students brought in some of the materials for information dissemination. Since monies were not requested in the proposal for such activities, this was the only way that these services could be provided.

New York City

Our program in New York City was hosted by Aspira of America's National Health Careers Program. Aspira is the largest Puerto Rican community-based organization in the United States. Its National Health Careers Program, funded by the Robert Wood Johnson Foundation and the Health Careers Opportunity Program (HCOP), operates in six sites around the country, including Puerto Rico. The program, created to develop an interest in health-related professions for Puerto Ricans, provides counseling, health career conferences, workshops, health clubs, and other services to a mix of Puerto Rican and other students at all six sites. Our program in New York provided an MCAT preparation course for Aspira's New York and New Jersey premedical students. Students who were not part of Aspira also participated, but these quickly joined the organization.

Aspira, in addition to giving stipends to the participants, provided our program with office space, some clerical assistance and counseling, as well as some guest speakers. Our program staff in New York City consisted of a part-time program coordinator and several instructors. The advantages of such an arrangement included:

- Access to the target population, therefore less effort and time expended on recruitment activities
- Provision of some services and resources by the sponsoring agency
- Access to Aspira's contacts in New York
- The possibility of Aspira's continuing the program in the future

Disadvantages of this co-sponsorship included:

- Lack of complete control over the selection process. (Although selection criteria were outlined, Aspira counselors made the final decision as to who was admitted into the program.)
- Poor control over record-keeping. (Because counselors were in two different locations and our office was in another city, it was extremely difficult to keep track of all records. This resulted in some student records and several evaluations being misplaced.)

On the whole, this association was a fruitful one. Aspira cooperated with us throughout the program year, and the two groups worked well together. Most of our misgivings about the New York experience center around expanding a program to a far-away site without the requisite support for such a move. We were very fortunate in many ways. First, we were able to employ as the New York program coordinator a capable and energetic former Washington employee. Second, we were able to obtain the sponsorship and support of an established and respected organization.

Third we were able to locate teaching facilities at two medical schools free of charge. Fourth, it was possible for us to recruit and hire five excellent instructors for the program. Were we to do this again, however, we would include in our proposal funds for a full-time coordinator, part-time clerical staff and office rental.

Although the setting or settings in which a program such as this operate(s) might require some adjustments to the original program plan, the following are the basic elements which can be translated into a variety of settings:

1. The selection process (including a diagnosis of student weaknesses)

It is essential, both for selection purposes and for curriculum planning purposes, that selection criteria be applied in order to screen applicants to the program. These criteria should include: completion of basic science courses; attainment of a tenth grade readding level as measured by the Nelson-Denney or other reading test; intention to take the MCAT soon; and test performance on a diagnostic test or tests in MCAT subject areas.

2. Teacher training

Instructors in an MCAT preparation program should be familiar with the test itself. They should be aware of the depth and breadth of subject coverage in the test and teach only as much as is covered in the test. They should also be knowledgeable concerning item types that appear on the MCAT. It is extremely important, as well, that they have a clear understanding of student academic weaknesses--in their particular areas as well as in other areas. A physics instructor, for example, should know what mathematical computations his/her students are capable of performing. There should also be coordination between some of the subject areas; for example, problem solving and physics.

Teacher training workshops (one one-day workshop at the start of the program) are an excellent means of ensuring instructors' knowledgeability in the above areas. Bi-weekly instructor/staff meetings serve to reinforce this knowledge and to foster cooperation and coordination among instructors and staff. They also help to maintain an esprit de corps among instructional and administrative staff which is an important element in operating an effective program.

3. A review of all MCAT subject areas

Although there are some MCAT preparation programs that do not cover all MCAT subject areas, omitting, for example, reading or problem solving, it has been our experience that minority students require instruction in all areas. According to AAMC data, minorities tend to score lowest on the

reading, quantitative skills and physics sections, and many medical schools consider the reading score crucial.

4. Study skills and test-taking techniques

This is a vital element in any MCAT preparation program, and all instructors of all subjects should be trained in these skills in order to reinforce them in their students. Usually one instructor, often the reading teacher, has the principal responsibility for instructing students in these skills, and several hours at the beginning of the program are devoted to this area.

5. Practice tests

MCAT-length practice tests provide experience and exposure to the ordeal of taking the real MCAT. The closer the test to the real MCAT, the better. There are however, very few tests that approximate the MCAT in type and difficulty in all subject areas. Practice with shorter tests in subject areas are also helpful, particularly if they are timed.

The above five elements are the most important components of an MCAT preparation program. Other components, such as counseling, field trips, essay writing, application completion, etc. are optional and, depending on the setting, may be included or not in such a program.

Factors which may affect the structure of a program are:

1. Resources/Time

An institution may have a limited amount of time or limited resources to implement an MCAT preparation program. In a case such as this, it should be noted that the better prepared the students are, the less preparation time they need. Or perhaps an institution may have only a few weeks during the summer in which to prepare students for the MCAT. An intensive all-day, five days a week course might be the answer here.

There is always the danger, however, of providing help to students who are so well prepared that they would have performed well on the MCAT without the program. One should be aware of the trade-offs involved in cutting time and resources, and should structure the program accordingly in order to reach the students who do need help, while providing sufficient time and resources for them to reach an adequate level of improvement.

2. Setting

Whether the course is given on a college campus, in the offices of a community-based organization, or at a non-profit institution will affect certain elements of the program such as recruitment, time of instruction, length of program, etc.

Many MCAT preparation programs are part of a larger summer program, with only a few weeks available for instruction. This limitation can be overcome by setting selection criteria fairly high; that is, only accepting students who can benefit from a few weeks' instruction, and by stressing test-taking strategies and study skills instruction.

Project Description

Under the original proposal, the four primary activities for implementing the project were: identification and selection of students, administration of the Pre-Medical Student Achievement Test (PMSAT), selection and training of tutors, implementation of the program. This project description highlights how these activities were executed during the life of the project.

Identification and Selection of Students

During the first year of the program, SNMA advertised the program by visiting premedical student advisors at area colleges and universities, contacting premedical student clubs, distributing posters and brochures on area campuses, and airing public service announcements on the Howard University radio station. Sixty-three students applied for the program of whom forty-three took the Pre-Medical Student Achievement Test (PMSAT).

Although the original proposal suggested that the students selected would be juniors or seniors who anticipated applying to medical school during the year, or students who were in the process of completing courses consistent with preparation for the MCAT and demonstrated high school equivalent reading skills, those criteria were not used. All applicants to the program were accepted, regardless of science background or math and reading skills.

In September 1981, EPRI, then the evaluator of the project, convened a planning and evaluation conference attended by area experts in administering intervention programs for minority students. Because the first year selection process required little commitment from the student beyond taking the PMSAT, and the stated selection criteria were not adhered to, many students attended classes sporadically and needed remediation rather than academic enrichment in the MCAT subareas. Additionally, the participants were all enrolled in one institution rather than representing the cross-section of minority premedical students found in the Washington area. As a result, one of the issues addressed at the September conference was the development of strategies for identifying and selecting students. The conference participants urged us to impose selection criteria that were stricter than those used in the first year and to develop an application process beyond the students merely taking the PMSAT. These suggestions were incorporated in the second year of the grant.

Student selection criteria for Year Two were expanded to include: completion of a Student Background Questionnaire which elicited academic and demographic data, completion of coursework in the MCAT subareas by the beginning of the summer session, plans to take the September MCAT, submission of transcripts, and a score of 4 on the reading section of the PMSAT.

The recruitment activities for Year Two were also expanded. These activities began in September and continued through November 1981. Premedical advisors at area colleges and universities were contacted and the program described to them; public service announcements were aired on area radio stations; posters and brochures about the program were distributed on area campuses; and contacts were made with student biology and health clubs. Project staff also attended the AAMC (Association of American Medical Colleges) workshop for minority students which is part of the AAMC Annual Conference to discuss the program. A project logo was developed depicting a slightly dazed cat dressed in medical garb with the caption "Are YOU Ready for the MCAT?" which appeared on all flyers and posters advertising the program.

These efforts attracted a wide cross-section of students, as registrants for the PMSAT came from every major university in the Washington area. Eighty students applied for the program; sixty-three took the PMSAT.

Student recruitment activities for the third year of the project began in September 1982 and ended in November 1982. To identify students, project staff contacted minority premedical student advisors, basic science instructors and department chairpersons, and equal educational opportunity programs on area campuses and described the program to them. Other recruitment activities included: public service announcements on area radio stations and advertisements in campus newspapers, appearances on campus radio talk shows, contacting former students to ask their assistance in advertising the program, attendance at the AAMC workshop for minority students, distribution of flyers and posters (with the project logo) on area campuses, and attendance at student biology and health club meetings to discuss the program. These recruitment efforts resulted in a wider cross-section of applicants than had been realized in the previous two years. Students from every major university in the Washington area and as far away as Baltimore registered for the PMSAT. One hundred fifteen students took the PMSAT.

The selection criteria used in the third year were similar to those of the second year. Students were required to complete a Student Background Questionnaire and receive a score of 4 on the reading section of the PMSAT; those scoring below 4 were required to take the Nelson Denny Reading Comprehension Test and achieve a tenth grade reading level. Applicants were also required to have completed coursework in the MCAT subareas by the beginning of the summer session, to have maintained at least a 2.0 grade point average as verified by transcripts, and to have intended to take the September MCAT.

The intervention program was expanded to New York City during the third year and served primarily Mainland Puerto Rican students. Participants in the New York program were students affiliated with Aspira, the

sponsoring agency, or students who had been recruited from area institutions. There students were selected on the basis of the criteria indicated above. Sixty-five students took the PMSAT. Thirty-five of these students registered for Phase One.

As will be discussed below, the project was reorganized into two phases during the second and third years. Students selected for the second phase of the program were primarily those who had attended Phase One classes regularly (six out of eight classes) and who had received recommendations from the instructors. During the second year, all Phase One participants were invited to participate in Phase Two. Seventeen of these students participated. In the third year, students were again required to attend Phase One classes regularly and receive recommendations from the instructors to be considered for Phase Two participation. Additionally, students were required to sign a written contractual agreement which delineated their responsibilities for attending classes, arriving promptly, and completing all assignments. Thirty-nine of the sixty students who participated in Phase One registered for Phase Two in Washington. In New York, twenty students who had participated in Phase One registered for Phase Two.

In the second and third years, students who had heard about the program but had not participated in the first phase received special permission to participate in the second phase. These students were selected by the criteria cited above, with the exception of taking the PMSAT. Six of these students received permission to participate in Phase Two during the second year of the program; ten in the third year in Washington and six in New York.

Administration of the PMSAT

The Student National Medical Association developed the Pre-Medical Student Achievement Test as a broad diagnostic and predictive instrument. As a diagnostic tool, students' scores on the PMSAT could be evaluated to determine their need for enrichment, reinforcement, or, in extreme cases, remediation in the MCAT subareas. It is a predictive instrument also, since its purpose is to estimate future student performance on the New MCAT. The general design of the PMSAT, except in length, approximates the New MCAT. It was also developed to be a somewhat easier test than the MCAT. The content coverage is less extensive, but the sampling of content knowledge and reasoning is adequate to assure a good estimate of actual performance levels. Administration of the PMSAT was a second activity of the project.

During Year One, the PMSAT was administered to forty-three applicants two days before the intervention program began. This created difficulties because of delays in score reporting and the lack of opportunities for staff or tutors to learn about the students' abilities prior to the beginning of the intervention program.

In their evaluation of the first year of the program, the project counselors commented that the PMSAT should have been given sufficiently early so as to have the test scores reported and evaluated before the beginning of the program. This would have facilitated the screening and advising of students. Based on these and similar comments, the PMSAT, during the second year, was administered on three dates in November and December 1981 to sixty-three students. By the end of January the test scores had been analyzed and diagnostic evaluations made regarding students' needs. Students were then counseled individually, their scores explained, and the intervention program described. Approximately forty students registered for the program at that time.

At the end of the second year a debriefing was held with project staff and tutors. The project's Advisory Board was convened in September 1982. Among the suggestions offered at those two meetings for redesigning the project for the final year were methods of expanding the number of student participants. In an effort to increase the number of students and to continue to select students who could be helped most by the program, the PMSAT was administered on four dates in November and December, 1982. One hundred fifteen students took the examination. By the end of January the test scores had been analyzed and diagnostic evaluations made regarding student needs. Students were asked to arrange appointments with project staff to discuss their results. Those students who accepted this invitation were counseled individually regarding their test scores and their academic preparedness for the MCAT and medical school admission. Approximately sixty-five students registered for the program.

The PSMAT was offered three times in November and December 1982 to the New York participants; twice in New York and once in New Jersey. The Washington schedule for analyzing scores, completing diagnostic evaluations, and counseling students regarding their test scores was replicated in New York.

Tutor Selection and Training

The tutors for Year One were recruited from area graduate and professional schools. The tutors selected included one physician, one medical student, and eight Ph.D. candidates. Training for the tutors occurred the Saturday prior to the beginning of the project and consisted of a general orientation to the project and its goals and objectives, a description of the PMSAT and its functions, a review of the curriculum

materials to be used, and a discussion of the evaluation plans. Two aspects of the program not undertaken in the training session were study skills and test-taking techniques.

Tutors for Phase One of the second year were recruited from area intervention programs. The two selected, one each for reading and quant/ problem solving underwent a one-day training session to orient them to the EPRI program. That training session also consisted of a review of the curriculum materials to be used, and study skills and test-taking techniques. This training session was supplemented by ongoing meetings among the tutors and project staff.

The basic science tutors selected for Phase Two were recruited from area colleges and universities and on recommendations from students. Two tutors were selected: a Ph.D. candidate and a science professor in an area junior college. These tutors were joined by the reading tutor from Phase One. The quant/problem solving tutor from Phase One was a physicist and also provided tutoring in that area. A writing tutor was recruited who had worked in a similar intervention program.

Training for the tutors consisted of a one-day workshop which provided a general orientation to the project, including a description of the curriculum to be used, distribution of guides from which the tutors were to develop their curricula, and study skills and test-taking techniques. During Phase Two, there were weekly staff meetings which provided continuous training to the tutors.

The two tutors selected for Phase One of the second year returned to provide instruction in Phase One of the final year. As a result of their prior experience in the project, they were thoroughly familiar with the project's goals and objectives and the curriculum materials. A one day workshop was convened prior to the beginning of Phase One to discuss the design of the project and suggestions for its implementation.

Three basic science tutors were selected for Phase Two. These tutors were recruited from area colleges and universities and on recommendations from students, intervention program administrators, and basic science department chairpersons. The tutors selected included a physics professor from an area college who had taught in similar intervention programs and had administered programs in the sciences for high school students interested in scientific and health careers, an engineering and mathematics professor from an area university who also taught in an area preparatory school, and a graduate student in biochemistry. The writing tutor from Year Two returned. These tutors were joined by the reading instructor from the previous year. Training for these tutors replicated that of the previous year and was supplemented by biweekly staff meetings.

The tutors selected for Phase One in the New York program were recruited from medical schools and other intervention programs in New York. Two instructors were selected: a Ph.D. candidate as the reading instructor and an instructor in an area college for quant/problem solving. Training for these tutors consisted of a one-day workshop conducted by the reading instructor from the Washington program and the project director.

Four basic science instructors were selected for Phase Two of the New York program: a Ph.D. candidate and three medical students. The reading instructor from Phase One returned to provide instruction in reading, study skills, and test-taking techniques. The project director and the reading instructor from the Washington program were joined by the Assistant Director of the Transitional Year Program of SUNY-Binghampton, an expert in science problem solving, to provide training during a one-day workshop.

Program Implementation

The original proposal suggested that actual tutoring would be conducted in twelve weeks of one-week modules in which five tutors would cover the content areas of the MCAT for each of five days. On Saturday morning students would receive individual counseling and supplementary materials in their weakest content areas and instruction in study skills and "test-wiseness." There were, however, significant changes in those plans. Due to difficulties in finding space for the program and problems related to mid-year break and spring recess, the program ran for slightly under seven weeks. Furthermore, the study skills and test-taking sections were not included.

The program was conducted at the Howard University Counseling Center. Classes were held in the evenings for two hours, four evenings per week. On Saturdays students received individual instruction and consultation. This schedule permitted students maximum opportunity to receive assistance in all subjects as the courses--biology, physics, chemistry and mathematics --were taught daily with no changes in content over the four days. Thus, students who needed help in all areas were able to receive it, but individuals seeking intensive assistance in a single area were more restricted. The New MCAT Preparation Guide by James Flowers was the basic text for the intervention program; however, SNMA staff and the tutors provided additional materials as needed. In addition to the intervention tutoring staff, the project employed two counselors from the Counseling Center who advised students concerning coursework necessary for medical school, medical school application procedures, and, when necessary, alternative career choices.

Attendance at the sessions during the first year ranged between ten and fifteen students prior to the spring recess. Additionally, the tutors noted that most of the students needed remediation rather than a

review in the subject areas. The participants at the planning and evaluation conference convened by EPRI in September 1981 urged us to avoid scheduling the program to conflict with spring recess and final examinations. Moreover, they suggested that the program be reorganized into two phases. Phase One would be a series of all-day Saturday sessions beginning in February with classes in reading, study skills, qualitative skills, and test-taking skills. This phase would be beneficial in preparing students for the summer session in which intensive tutoring in all of the MCAT subareas would be provided, and would allow project staff to identify and interview those students with the most motivation as candidates for the more intensive summer session. These suggestions were incorporated into the project during the second and third year.

The intervention program was restructured in accord with the suggestions noted above. In Year Two, Phase One began on February 20, 1982 and ended April 17, 1982. It consisted of eight, all-day Saturday sessions which provided tutoring in reading, study skills, problem solving, test-taking techniques and quantitative skills. Reading and problem solving were incorporated into Phase One because these are the areas which pose the most difficulty for minorities on the MCAT and because of the students' need for extensive instruction in those areas. Speakers were invited each week to address some aspect of medical education. These included experts on the New MCAT, financial aid, and medical school admissions and interviewing techniques. A resident and intern spoke regarding their experiences in choosing a medical school and residency. The Director of Minority Affairs for AAMC and a University of Maryland professor who is an expert in minority medical admissions conducted a simulated minority admissions workshop for students and project staff. Of the forty students who registered for the program, twenty-seven attended regularly (six out of eight sessions).

Phase Two was held from June 14, 1982 to August 6, 1982 at the Georgetown University School of Medicine and Dentistry. This phase operated for eight weeks, five days per week. Classes were held from 9:00 A.M. to 4:00 P.M., Monday through Thursday. On Fridays classes ended at 10:30 A.M. to provide students an opportunity to meet with medical school representatives who were on the campus weekly. Class sessions covered reading, writing, study skills, test-taking techniques, problem solving, quantitative skills, biology, chemistry--organic and inorganic--and physics. Two 6-1/2 hour simulated MCAT examinations were administered under conditions that replicate those of the actual MCAT, and MCAT-type quizzes were given several times per week in the class sessions. Twenty-six students registered for the program; seventeen attended regularly.

A counselor was available to provide weekly individual and group counseling. The EPRI project coordinator was relocated to the campus

the entire program to supervise the sessions and coordinate the classes with tutors and students. Students also had use of the Georgetown University Medical Library.

The materials used by the instructors in the second year were expanded from Year One. In addition to A Complete Preparation for the New MCAT by James Flowers, the following materials were used: Barron's How to Prepare for the Medical College Admissions Test, The New MCAT Student Manual by AAMC, Problem Solving and Comprehension A. Whimbey and J. Lockhead, and Organic Chemistry, Class Lecture Notes, Fonahan C. Ayorinde, Ph.D. The simulated examinations used as the pre- and post-tests were also changed to those found in the Harcourt, Brace, Janovich How to Prepare for the New MCAT. Those examinations were used because they were a closer approximation of the MCAT in terms of length and degree of difficulty. The PMSAT was used as a diagnostic instrument for selecting students for participation in Phase One.

During the third year, the instructional materials included those from the second year in addition to the New Medical College Admission Test by B. R. Fein, the Contemporary New Medical College Admission Test, Schaum's Outline for Essential Computer Mathematics, and Science News Magazine. The pre- and post-tests, were again taken from the Harcourt, Janovich How to Prepare for the New MCAT. In Years Two and Three, these instructional materials were supplemented by specially prepared materials by the tutors.

During the third and final year of the project the program was again structured into two phases. In Washington, D. C., Phase One began on February 5, 1983 and ended April 4, 1983. Sixty-five students registered for the program; fifty attended regularly. This phase consisted of eight, all-day Saturday sessions which provided tutoring in reading, study skills, problem solving, test-taking techniques and quantitative skills. As in the second year, speakers were invited each week to address some aspect of medical education. These included experts in medical school admissions, the New MCAT, writing the medical school application essay, and osteopathic medicine. A resident spoke regarding her experiences in medical school and in choosing a medical school and residency, and a representative of the Uniformed Services Medical School provided a prestation on attending medical school as a member of the Armed Forces.

Thirty-nine students who had attended Phase One submitted applications for participating in Phase Two. Students who heard about the program but who had not attended Phase One contacted project staff and asked permission to participate. Forty-nine students registered for Phase Two, of whom thirty-five attended regularly.

Phase Two was held from June 6, 1983 to August 13, 1983. Since the great majority of students had summer jobs, classes were held from 6:00

P.M. to 9:00 P.M., Mondays through Fridays, and 9:00 A.M. to 4:30 P.M. on Saturdays for this ten week period in the EPRI conference room. Instruction was provided in reading, writing, study skills, test-taking skills, problem solving, quantitative analysis, biology, chemistry, and physics. Friday evening sessions consisted of MCAT-type quizzes in each of these subject areas. Three 6 1/2 hour simulated examinations--a pre-test, mid-term and post-test--were administered under conditions that replicate those of the actual MCAT.

Biweekly meetings were held with the students as a group to discuss their concerns and progress. The project staff rearranged their working schedule so that at least one staff member was on the premises at all times to coordinate the project and provide individual counseling to students.

Phase One of the New York program was held from February 5, 1983 - April 4, 1983 at the Columbia University College of Physicians and Surgeons. Thirty-five students affiliated with the New York and New Jersey branches of ASPIRA registered for the program. Twenty-seven attended regularly. Phase One consisted of eight all day Saturday sessions which provided tutoring in study skills, test-taking techniques, reading, problem solving and quantitative analysis. Experts in various aspects of medical education were invited weekly to provide a one hour presentation to the students. A former EPRI employee served as project coordinator and was on site at all times. Counseling regarding medical school admissions and students' progress was provided by ASPIRA counseling staff.

The second phase of the New York program began on June 6, 1983 and ended July 29, 1983. Classes were held at the Mt. Sinai School of Medicine from 9 A.M. to 4:30 P.M. five days a week. Instruction was provided in biology, chemistry, physics, reading, problem solving, quantitative analysis, study skills, and test taking techniques. The project coordinator was relocated to Mt. Sinai during the entire program to supervise and coordinate the classes, conduct bi-weekly staff meetings, and execute general administrative responsibilities. Thirty-one students registered for the program; twenty-six attended regularly.

Outcomes and Impacts

While the primary objective of this project was to provide academic enrichment (tutoring) to minority premedical students in the Washington, D. C. and New York areas who were preparing for the New Medical College Admissions Test, several unanticipated outcomes resulted.

Unanticipated Impacts

Perhaps the greatest impact was on the students, who were able in a noncompetitive, supportive atmosphere, to participate in an intensive and

rigorous intervention program. Students often commented what while much was expected of them and while the workload was tremendous, the absence of the competition that is often found among premedical students and the individual attention given to them, enabled them to build confidence in their abilities, to learn to work together in a group, and to take full advantage of the resources at their disposal. Time and again, the project staff were told how the program was not only providing students with skills which would help them on the MCAT, but also that the time management, study and test-taking skills learned were being incorporated into their undergraduate studies and would be useful in their future educational and professional endeavors. The statements by two students which are found below typify the comments we received.

- "I am sorry that I did not have an experience such as this before I went to college because I have learned what the learning experience really is--an ongoing process that never ends."

- "I found myself learning for the first time concepts that I should have learned during my undergraduate studies, and if I had the power to choose my instrutors, I'd want them to have the same kind of attitude as my instructors this summer had."

The impact of the program can also be gauged by the commitment the students made to the program. Participation in the program required devoting eight weeks during the academic year and eight to ten weeks during the summer months to the intensive pursuit of one goal. That time commitment had to be shared with their other academic and personal commitments. For students participating in the second phase of the program, participation in the program often precluded securing summer employment or involved sharing the demands of the program with those of employment. The usual summer leisure activities were delayed or aborted completely. Despite these demands, throughout the second and third years of the program, a high retention rate was maintained. During Year Two, 60 percent of the students who registered for Phase One attended classes regularly and 58 percent of the twenty-seven registrants for Phase Two were retained in the program.

The retention rates for the third year are even higher than those of the second year. In Phase One, the Washington and New York programs had retention rates of 83 percent and 77 percent, respectively. The retention rate for Phase Two in Washington was 71 percent while New York retained 84 percent of its participants. This overall retention rate of 72.2 percent for the second and third years of the program provides substantive evidence of the commitment of the students to the program.

The program's impact on students can also be measured by the degree to which they shared their experiences with their peers and encouraged them to apply. Each year project staff admitted students to Phase Two who had heard about Phase One and wanted to participate in the program. By the third

year some applicants could not be admitted because of space limitations. Well before recruitment efforts formally began, students were contacting project staff to register for the program, and although the project was terminated in August 1983, staff are still receiving letters and telephone calls from students who want to apply to the program or want advice on how to prepare for the MCAT and complete the medical school admissions process.

A second area of unanticipated impact was on the instructors. Many of the tutors had not considered seeking future employment in intervention programs, but after this experience have sought and secured teaching positions in other intervention programs. Others found that many of their assumptions regarding the learning process and the extent to which traditional academic settings prepare students were being challenged, and have integrated the concepts used in the tutorial programs into their teaching strategies. Instructors increasingly began to invest time and energies outside the project classes, providing tutoring, counseling and other assistance to students.

A third unexpected outcome of this project has been its impact on other intervention programs. For example, rather than compete for students, this project and the Georgetown Health Careers Program worked together, sharing resources and experiences to solve problems and advice on how to expand the focus of the programs; both programs benefitted from that close working relationship. As the premedical education community became aware of this project, staff were contacted for advice, recommendations, and technical assistance. In the last year of the grant, the project staff received a dissemination grant and is in the process of conducting regional workshops with premedical advisors and other persons interested in developing intervention strategies. The workshops which have been held thus far have proved such a success that the workshop leaders have received several requests to visit programs across the country to provide additional technical assistance in intervention program design, implementation, and administration.

Project staff were also greatly affected by this project. The staff came to know each student individually and found themselves providing counseling not only regarding students' performance in the program, but also academic and career advising, and personal counseling. Staff secured MCAT application forms and catalogues from all U.S. medical schools to assist students with the application and admissions process, encouraged some students to consider other careers in the health professions, wrote letters of recommendation, and were always available for advice and support. Working on this project provided much personal gratification to project staff who came to appreciate the intangible satisfaction that is realized when one works with students on a regular basis and assists them in realizing their full potential. It confirmed their belief that public policy initiatives must be judged by the extent to which they afford individuals an opportunity to achieve their goals.

Evaluation

Evaluation of this project has been formative and summative. During the first year of the project, the Education Policy Research Institute (EPRI) of the Educational Testing Service evaluated the project, under a subcontract to the Student National Medical Association. The evaluation was based on information from the Student Project Evaluation, interviews with students, tutors, and counselors, and an analysis of demographic data from the Student Background Questionnaire. Seventeen students participating in the program completed written evaluations of the program design and facilities, and the tutorial comonents and instructional materials. Tutors completed an evaluation of the training session, length of the program, student selection, program administration, program content, and offered suggestions for program improvement. The tutors also provided written comments on the overall program. Additionally, a summary of student demographic data was prepared using information from the Student Background Questionnaire and a statistical analysis was performed that tested the hypothesis that selected demographic characteristics would affect PMSAT performance. The results of those evaluations are reported in the November 1981 Year One Final Report to FIPSE.

In the second year, students and tutors were required to evaluate Phase One and Phase Two of the program. Twenty-four of the Phase One participants completed a written evaluation of the program design and facilities, individual tutors and instructional materials, usefulness of weekly speakers, and provided comments on the overall program. Tutors completed a written evaluation of student preparedness and selection, facilities, length of program, and program coordination. A similar evaluation was undertaken for Phase Two. Students completed a seventeen page evaluation of the program in which they were asked to describe the purpose of the program and their expectations, comment on the program design and facilities, identify program weaknesses and strengths, evaluate each tutor and the instructional materials used, and provide comments on the overall program. Tutors completed a written evaluation of the program administration and coordination, student preparedness and selection, program strengths and weaknesses, and provided comments for redesigning the third year of the program. Additionally, tutors provided an overall evaluation of each student's motivation, perseverance, progress, willingness to invest time outside class in class-related activities, participation in class, and attendance. Comments and suggestions for each student were also provided.

A statistical and item analysis of the results of each of the 6 1/2 hour simulated MCAT examinations was distributed to the instructors which was used to restructure their teaching approaches and to measure the progress of each student. The results of the written student and tutor evaluations for the second year are reported in the Second Year Report to FIPSE of November 1982.

Twenty-seven participants in the New York program and twenty-one of the Washington participants completed written evaluations of the third year Phase One program. The results of those evaluations are summarized in Appendix A.

The results of the Phase Two evaluations for that year which were completed for New York and Washington by nine and twenty students, respectively, are also in Appendix A.

Summative Evaluation

The summative evaluation of this project consisted of the following:

- a statistical summary of the pre and post test scores on simulated MCATs for third year participants
- a statistical summary of the MCAT scores of participants
- a measure of the relationship of national means to participant cumulative MCAT scores

Statistical Summary of Pre- and Post-Test Scores, Year Three

An analysis of the pre-and post-test scores for students participating in Phase Two of the New York program reveals the following:

Table 1

Mean Pre- and Post-test Scores by Subarea, New York

Subarea	Pre-test Mean	Post-test Mean
Biology	8.0	7.0
Chemistry	5.0	6.0
Physics	4.0	6.0
Science Problems	5.0	5.0
Reading	9.0	9.0
Quantitative Skills	7.0	8.0
Total	38.0	41.0

These results were analyzed using matched t-tests, which are conventionally used for pre- and post-test scores. The t values are based on MCAT equivalent means; however, an analysis using the raw scores yielded essentially the same results. The t-test revealed that there was no difference in the means for the biology and reading subareas; in fact, the means decreased from the pre- to the post-test. The t on the science problems subarea was positive, though not statistically significant (.79, $> .05$). There were significant differences in the pre- and post-test means for chemistry ($< .05$), physics ($< .05$) and quantitative skills ($< .05$). In sum, based on this sample, three positive and highly significant results were obtained in chemistry, physics, and quantitative analysis, one nebulous result was received in science problems where there was a positive, although not significant difference in means, and negative scores in biology and reading.

The analysis of the pre- and post-test scores for students participating in Phase Two of the Washington program is summarized below in Table 3.

Table 2

Mean Pre- and Post-test Scores by Subarea, Washington

Subarea	Pre-test Mean	Post-test Mean
Biology	8.3	7.9
Chemistry	5.9	6.5
Physics	5.3	5.7
Science Problems	5.2	6.5
Reading	9.7	9.7
Quantitative Skills	8.2	9.2
Total	42.5	45.6

A t-test of means produced the following results. Highly significant differences were found in quantitative analysis (<.05) and science problems (< .05), and significant differences were found in chemistry (< .05). Although the mean for physics increased from the pre-test to the post-test, it was not a statistically significant increase (>.05). The mean for biology decreased from the pre-test, while the mean for reading essentially remained the same. The overall difference in means of 3.1 is statistically significant (< .05).

The analysis of the New York and Washington difference in means reveals significant differences for both groups in chemistry and quantitative skills, while reading and biology did not result in statistically significant differences for either group.

It should be noted at this point that since the pre-test was administered at the beginning of Phase Two, improvement in reading and quantitative skills during Phase One would be reflected in these pre-test scores. A comparison of these scores on the PMSAT (which was administered at the beginning of Phase One) with the pre-test scores for Washington, D. C. as follows shows a considerable improvement in reading and quantitative skills: a 4 point increase in reading and 3 point increase in quantitative skills.

Since a large proportion of Phase Two participants in the New York program did not take the PMSAT, it is not possible to make the same comparison for that group.

Summary of MCAT Scores for Program Participants

MCAT scores are available for thirty-six students who participated in Phase Two during the second and third years of the program. Those scores are analyzed below.

Table 3

Comparison of Participant Mean PMSAT Scores and Mean MCAT Scores with Mean MCAT Scores of Black Applicants and Acceptees to Medical Schools, 1982-83

Subarea	Participant PMSAT	Participant MCAT Mean	Applicant Mean	Acceptee Mean
Biology	4.7	7.1	6.0	7.3
Chemistry	4.8	7.0	6.0	7.2
Physics	6.0	6.7	5.9	6.8
Sci. Problems	5.9	6.5	5.7	6.9
Reading	5.6	6.4	5.3	6.6
Quant. Skills	5.3	6.0	5.0	6.1
Total	32.3	39.7	33.9	40.9

Note: In addition to being shorter (4-1/2 hrs. versus 6-1/2 hrs.) than the MCAT, the PMSAT was developed to be less difficult. The variance in difficulty, however, has not yet been determined.

As can be seen from Table 3, there is a difference of 1.2 between the overall mean scores of students participating in our project and those of Black students accepted to medical school in 1982-83. This difference at the .05 level has no statistical significance. Thus, participants' MCAT scores and those of acceptees can be said to be the same.

Predictability of National Mean on Participant Cumulative Scores

An attempt to determine the relationship between the mean cumulative scores of the twenty-five Phase Two, Year Three participants for whom MCAT scores were available and their performance on individual subareas of the test revealed the following:

- 69 percent of the participants who received a 7 and above in biology obtained a cumulative score of 40 or more
- 80 percent of the participants who received a score in chemistry equal to the national mean obtained a cumulative score of 40 or more
- 69 percent of the participants who received a 7 and above in biology obtained a cumulative score on 40 or more
- 80 percent of the participants who received a score in chemistry equal to the national mean obtained a cumulative score of 40 or more
- 82 percent of the participants receiving a 7 and above in physics received a cumulative score equal to or greater than the cumulative national mean
- 90 percent of the students receiving a 7 or greater in science problems received a cumulative score of at least 40
- 64 percent of the students receiving at least a 7 in reading obtained a cumulative score of 40 or more
- 70 percent of the participants who received a 6 and above in quantitative skills obtained a cumulative score of 40 or more

At the time of writing of this report, MCAT scores for over half the New York participants were unavailable. Therefore, it was not possible to include them in the evaluation.

Summary and Conclusions

The underrepresentation of minorities in the medical profession can be considered to be the direct result of their underrepresentation in medical education. Efforts to increase the participation of minorities in medical school have met with very little success; in fact, there is evidence that minority access to medical education has recently declined.

One of the major barriers to minority admission to medical education is the fact that minorities tend to have low scores on the New Medical College Admissions Test (New MCAT). Three approaches exist in addressing the problem posed by low minority MCAT scores:

1. Increasing the size of the applicant pool by attracting competitive minority students.

2. Relaxing admissions policies so that the lower MCAT scores formerly considered competitive for minority applicants will still prevail regardless of an increase in nonminority scores.

3. Improving minority performance on the MCAT in order to increase minority competitiveness.

It is our feeling that the third approach is one that has the greatest probability of being sucessful as well as the one that has the potential for affecting the greatest number of students. Our program proposed to adopt this approach by establishing an intervention program to:

- improve minority student performance on the New MCAT
- increase student knowledge of tests and test-taking strategies
- develop a tutorial curriculum capable of national application that would be tailored to minority student needs in the skills necessary for high performance on the New MCAT.

Activities undertaken as a means of accomplishing the above were:

- identification of minority premedical students
- administration of a diagnostic test, the Premedical Student Achievement Test (PMSAT), to assess student weaknesses in MCAT content areas
- development of individual student need profiles and tutorial modules

- o training of instructional staff and counselors
- o delivery of test content and test construction instruction as well as study and test-taking techniques to support the development of learning and test-taking skills
- o delivery of an instructional program consisting of two phases--eight consecutive Saturdays in Phase One and eight weeks of intensive all-day, five-days-a-week classes in Phase Two
- o evaluation, analysis and dissemination of project results

The project, as it developed over a three-year period, focused on developing techniques to improve the skills of those students who lacked certain basic skills or who had gaps in their knowledge of one or more MCAT subjects. Much effort was made to ascertain the minimum level of skills required of students entering the program in order to ensure a certain level of improvement within the intervention period. Selection criteria were flexible enough so that not only the best students were eligible for the program. However, criteria were selected to exclude students incapable of improvement within a short period.

FIPSE funding of this project has resulted in an intervention program aimed at increasing minority scores on the New MCAT which focuses on the student who, although not competitive to begin with, has the potential to improve his/her skills within a relatively short period of time. The program's basic elements are readily replicable in other settings and the program design is flexible enough to conform to the constraints of time, resources, and setting.

Our experience in administering this program has led us to conclude that the skills required to score competitively on the New MCAT can, indeed, be developed through intervention by less than competitive students as long as they possess certain minimum skills. Focusing on such students is one of the most effective means of expanding the pool of potentially successful minority applicants.

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APPENDIX A

Formative Evaluation -- Year Three

Phase One Evaluation, New York

From attending classes in Phase One of the program, the New York students, in general, expected to: improve their analytical skills in the quantitative and reading areas; improve their test-taking abilities; and ultimately improve their scores on the MCAT. All but one of the participants reported that their expectations were met--one student reported that his expectations were not satisfied with the quantitative skills session. A majority of the students felt that the program was scheduled at a convenient time and place. Those dissatisfied with the location resided in New Jersey and had to commute for as long as 90 minutes to attend classes. Most students were satisfied with the length of the program, however, some would have preferred a longer program.

A wide range of responses was received regarding the strength of the program. Fifty-two percent mentioned the reading teacher's competence as a major strength. Other strengths of the program reported by the students included: the speakers; the program design and administration; and the sense of friendship which developed among the participants. When asked to identify any weaknesses of the program, fifteen of the students singled out the quantitative skills sessions as being problematic. Students felt that while the quantitative skills tutor knew his materials he did not express them well or cover a sufficient amount of material. Also mentioned as weaknesses were that the program was not long enough and that a stipend should have been provided.

Four medical students from the Mt. Sinai School of Medicine and the Director of Admission of the Osteopathic School of Medicine of New York provided presentations to the Phase One students. The students were unaminous in their praise of the speakers.

Among the comments received regarding the overall program were:

- I found Phase One to be a great asset in my preparation for medical school. It helped me especially in reading.
- The instructors chosen for Phase One were excellent. I felt very encouraged by the instructors to do better and that I can make it. They were aware of the language difficulties as most of us speak two languages and they had the patience to work with us.

Phase One Evaluation, Washington

When asked to briefly describe the purpose of the program, students were in agreement that the program had been designed to provide premedical, primarily minority, students a better understanding of the structure and content of the MCAT, and the skills necessary for achieving competitive scores. Twenty-one of the twenty-two respondents stated that the program had met their objectives.

The majority of the students felt that the program was scheduled at a convenient time and all but two found the location convenient. Eighteen reported that the program was just right as scheduled; however, the remainder wanted a longer program. Information and feedback was provided in a timely and responsive manner, and all but one student found the program interview and counseling session helpful in explaining the PMSAT results.

Students were asked to judge the usefulness of the PMSAT and the reading and quantitative skills quizzes. Eighty-five percent thought the PMSAT was a helpful indicator of their subject knowledge, 45 percent found it useful as an indicator of their progress and 91 percent stated that it was helpful practice for the MCAT. The reading quizzes were helpful as an indicator of the subject knowledge, reported 86 percent of the respondents, and an equal proportion found them helpful as an indicator of their progress. Twenty reported that these quizzes were helpful practice for taking the MCAT. Eighty-six percent of the students responded that the quant quizzes were helpful in indicating their subject knowledge and 77 percent found them useful as an indicator of progress and as practice for the MCAT.

A range of comments was received regarding the strengths and weaknesses of the program. Among the comments on the program's weaknesses were: we should have been given more tests; the program was too short; there was too little time to focus on so much; and the quant section was not as representative of the MCAT as it could have been. Comments regarding the strengths of the program included: the program provided knowledge on how to answer questions, take tests, and do well on them; the program gave an idea of what to expect on the MCAT and the procedures and methods for correctly answering questions; the program was well planned and executed; the teachers were enthusiastic as were the program coordinators; and the pace was such that instructors entertained questions without making students feel rushed.

The students were asked to evaluate the reading and quant/problem solving tutors and the instructional materials used. Twenty-one students responded that the reading teacher knew the materials and the students were unaminous that she used an adequate number of examples, covered a

sufficient amount of material which was paced just right, and was an excellent communicator with the students. Twenty students felt that the quant/problem solving instructor knew the materials and most felt he used an adequate number of examples, although a few would have preferred more tests.

Students reported that the resident was the most helpful speaker because of her personal insight into the medical school application, admission, and completion processes. They reported that all of the speakers were helpful as they provided different perspectives regarding medical education, including the interviewing process, the impact of MCAT scores on their admission, and the techniques which should be used to complete the autobiographic essay.

Several suggestions were offered for designing Phase Two, including making the program more intensive, providing an outline for students in advance so they could prepare for the classes, and administering more examinations. Two comments on the overall program were:

- I am very grateful for what you all have done for me. I would like to express my appreciation to you for giving me hope and for making me aware that there is someone who really cares whether I make it or not. I feel that your honesty has a lot to do with the respect I give to you.

- I feel very fortunate to have been a part of this program, and look forward to Phase Two although I know it will be much more intensive.

The tutors reported that although the degree of student preparedness varied, the mixture worked well as the students who were better prepared were able to assist the less prepared students by actively participating in the class discussions and thereby improving the preparedness of all students. The participants were judged to be very motivated and hard working. The administrative support and personal commitment of all involved were the primary strengths of the program.

Phase Two Evaluation

The Phase Two evaluation consisted of a written evaluation of the program by students and tutors and an individual student evaluation by each tutor. The results of the student and tutor evaluations of the program will be summarized after the following student demographic profile of the Phase Two participants.

Student Demographic Profile--Washington, D.C.

An analysis of the demographic data from the Student Background Questionnaire for the thirty-five students completing Phase Two of the Washington-based program reveals that the "typical student" was a Black, single, female, with an undergraduate major in an area other than biology, chemistry, physics, or mathematics. Her academic classification was bimodal, with an equal representation of sophomores and college graduates. This student was attending a public institution at which she maintains an overall 2.8 grade point average, and has taken all of the basic science courses required for medical school admission. She has received no financial aid to support her undergraduate studies.

Although this student had not taken the MCAT prior to participating in the program, she plans to use tutoring programs, academic diagnostic testing, study skills classes, commercial coaching and New MCAT study guides to prepare for the examination.

The "typical student" grew up in a suburban area where she attended a predominantly nonminority high school. Her parents are well educated: her mother is a college graduate and her father has completed graduate studies. Both parents are employed as professionals; the family earns over $25,000 per year.

This student is not currently employed, but has worked in the past in a research or clerical capacity. Her current income is $0-9,999.

The student is seeking to enter medical school because of past experiences in health related settings or because her interest in helping people could be fulfilled. She feels she has a 41-50 percent chance of gaining admission to medical school, but finding money for tuition and succeeding in the sciences will be her primary problems. The two greatest barriers to her admission are her grade point average and her need for financial aid. This student wants to practice general and family medicine.

Student Demographic Profile--New York

The "typical student" participating in the New York program was a Hispanic, single female. She is a junior or senior attending a public undergraduate school where she is a biology major. She has maintained a 2.8 grade point average, and has taken biology, organic and inorganic chemistry, and basic and college physics. Her undergraduate education is being financed by federal or state government aid.

This student had not taken the MCAT prior to enrolling in the program but plans to use a tutorial program to assist in her preparation. She may or may not use academic diagnostic testing, study skills classes, commercial coaching or MCAT study guides. She is uncertain as to whether or not she will use academic diagnostic testing, study skills classes, commercial coaching, or MCAT study guides.

She grew up in a large inner city area and attended a predominantly minority high school there. Her mother has completed some high school and is employed as a skilled worker; her father is a high school graduate and is also a skilled worker. The family income is in the range of $0-9,999.

The student is not currently employed, but has worked in health related settings in the past. Her current income is $0-9,999.

The "typical student" wants to study medicine because of her experiences in health related settings and to fulfill her desire to help people. Responses regarding her perceived chance of gaining medical school admission was bimodal: an equal number responded that they felt they had between a 41-50 percent and an over 60 percent chance of being admitted. A major problem to securing admission, for this student, was her need for financial assistance and succeeding in the sciences.

Phase Two Evaluation, New York

Nine out of twenty-six participants in Phase Two of the New York program completed written evaluations of the program. Although the sample is quite small, this summary represents the general opinion of the respondents. Students evaluated the program design and facilities, program tutors and instructional materials, and provided comments on the overall program.

The success of this program can be determined in part by the extent to which the participants' objectives or expectations were satisfied. The purpose of the program, as identified by the students, was to increase their MCAT scores by improving their test-taking ability and knowledge of the basic sciences. From the program they expected to gain confidence in their ability to learn and compete with others, an understanding of the basic concepts in the sciences, and more experience in taking examinations of varied duration. All nine of the responding students reported that their expectations had been satisfied. Similarly, all of the respondents felt that the program description provided an adequate overview of the program, that the program was scheduled at a conventient time, and that information and feedback had been provided in a timely and responsive manner. They were also in agreement that the program should have been longer.

Six out of the nine students had participated in study groups to share knowledge and identify problem areas. Of the courses offered, chemistry and physics required, on the average, the most outside attention in order to keep up with class lectures. Six hours per week for each was required. Less outside study time was required by the remaining courses: problem solving, 4.6 hours; biology, 4.5 hours; quantitative skills, 2 hours; and reading, 1.5 hours. All of the respondents indicated that the simulated MCAT exams and weekly quizzes were helpful in indicating subject knowledge and progress, and were good practice for taking the MCAT. Six of the respondents recommended that more simulated exams be offered. Additional tests, stated those students, would further assist them in become accustomed to taking tests under pressure.

Among the weaknesses of the program identified by the respondents were:

- o insufficient time devoted to chemistry and biology; not enough quizzes in those areas
- o poor location
- o no free days available during the week to take care of personal business

The major strength of the program was the quality of the instruction. All of the tutors were considered knowledgeable in their respective fields and concerned about the students' welfare. Without being specific, the students identified the biology, physics, chemistry and reading courses as the strengths of the program. Each was seen as providing a quick but thorough review of the material and valuable experience for taking the MCAT. Other strengths of the program identified by the students were the review materials, the student body itself, and the program coordinator.

Comments regarding the overall program involved requests for more time in chemistry and biology and more problems in problem solving. In terms of scheduling, the students suggested that the program be offered throughout the summer and on Saturdays during the Fall up to October 1 (the date the MCAT was administered).

Phase Two Evaluation, Washington

Twenty of the thirty-five students completing Phase Two completed written evaluations of the program. Students were asked to briefly describe the purpose of the program and what they expected to gain from participating. All of the students reported that the program's purpose was to assist them in preparing for the MCAT, although the form of that assistance varied from providing a review of the basic areas in the sciences, quant and reading through the administering of simulated MCAT exams, to preparing them by teaching techniques and skills which would enable them to perform competitively on the MCAT.

The students' expectations also varied: some expected to gain knowledge on how to increase their odds of performing competitively on the MCAT, others expected to gain confidence in their knowledge and abilities, and still others expected to learn the format of the MCAT and specific areas in which they need enrichment. The students were unaminous in reporting that their expectations were met, that the program description provided an adequate overview of the program, and that information and feedback was provided in a timely and responsive manner. Thirteen would have preferred a longer program, and nineteen found the time and location of the program convenient.

Nineteen of the twenty respondents felt that their ability to follow class discussion was contingent upon their having taken classes in the content areas. Problem solving required the greatest amount of out-of-class study--3.9 hours per week. Biology required 3.6 hours per week, chemistry and physics 3.5 hours, respectively; reading and quant each required 3.3 hours of study.

The majority of the students found the weekly quizzes and simulated MCAT exams a helpful indicator of subject knowledge, student progress, and good practice for taking the MCAT. All students wanted more simulated examinations, stating that the more practice they received, the more prepared they would be for the actual MCAT.

Among the weaknesses of the program identified by the respondents were:

- o too much emphasis on math in the quant section; review sessions should have been held for those students with weak math backgrounds
- o more practice examinations should have been given
- o classes met too many days of the week--not enough time for relaxation

Three students commented that no weaknesses were noted as they were too busy taking advantage of the opportunities.

Comments received regarding the stengths of the program included:

- o expertise of instructors and administrative staff
- o the comprehensive look at the subjects on the MCAT
- o the talented, enthusiastic group of instructors, the program administrators, and the organization of the program
- o the program directors and their genuine concern for the students; the instructors and their interest in student progress and willingness to invest time outside class to help students

The students agreed that the tutors knew their respective subject materials, presented their instruction in a clear and concise manner, and were very supportive. The comments below typify the comments regarding the individual tutors:

- o Biology/Chemistry: She was very good and absolutely knew the material; she was always encouraging and I liked the way she incorporated problems and questions into the dicussion of the topics being lectured on.

- Reading: She is an old fashioned, grueling, disciplined teacher, and I'd change absolutely nothing about her. I have learned things from her that I could not only use in medical school but in everyday reasoning.

- Physics: The instructional materials were very appropriate for the sessions, each topic was followed by a group of problems which helped enhance greatly my comprehension of the topic. His presentation was straightforward and yet simple which also helped me comprehend the topics--I only wish some of his peace of mind could have rubbed off on all of us.

- Quant/problem solving: He is the standard by which all teachers should be judged. He is brilliant, yet uncommonly personable and down to earth. He was very good in helping us look at problems in the right way to find the solution. Most of all his four-hour lectures were never boring as the energy he generated helped us boost ours.

Some of the comments on the overall program included the following:

- Everyone involved in this program should be commended. Among the professionals, the dedication to the students surpassed anything I had ever seen before. Furthermore, the perseverance of my classmates was something to behold. Never before had I seen a group of students so uniformly determined in their efforts to achieve a goal. Finally, I have never felt so much a part of a collective effort. Somehow I have the feeling that the good feelings and cooperation were due in large part to the efforts of the two selfless individuals who carried the program. Thank you.

- As the program approaches its end my feelings are both happy and sad. Happy because it has been an opportunity to meet and get to know people with the same kinds of interests as my own; sad because we will probably never meet again as a group. I've made many new friends; the program was conducted in a serious, yet noncompetitive manner. The instructors were enthusiastic and were as supportive to us as we were to each other. Toni and Jennifer gave us spiritual support and encouragement. Since everything was provided for us, essentially all we had to do was attend lectures and do the homework. The workload was voluminous, but probably only a small sample of the amount of materials we as medical students will be expected to absorb in a small period of time. I feel fortunate to have been selected as a participant.

Tutors' Evaluation--New York

All five instructors responded to the evaluation form. There was little uniformity in their interpretation of the various ellements of the program and in their feelings about the program.

Student Preparedness. Two of the three instructors believed that the students were prepared for the program. For the reading instructor preparedness meant that the students know the difficulty of the MCAT and what would be expected of them in Phase Two of the project. Moreover, preparedness meant that the students possessed the ability to read and the motivation to learn, both of which she believed the students possessed. Two other instructors suggested that the students were not so well prepared in that they had little familiarity with the material being covered. A problem cited was that there was disparity in the level of knowledge possessed by the students as a group. For example, some students had recently taken basic physics courses, others had taken them years ago, some had never taken them.

Student Selection. There was no strong agreement as to the student selection. One instructor expressed the belief that most of the students were not of the caliber necessary to become physicians. The remaining four instructors believed that the selection of students was adequate. One instructor felt that the selection of students was excellent because they all needed remediation in order to do well on the MCAT. Another instructor reported that selection was good because the students seemed genuinely anxious to learn and improve their skills and their background was sufficient to allow them to benefit from the course. The physics instructor found the student selection to be adequate except for the inclusion of one non-English speaking student.

Physical Facilities. Again there was some disagreement when it concerned the facilities. One instructor reported them as "barely adequate"; another requested a location with more board space . Two other instructors reported that the facilities were more than adequate. The remaining instructor suggested that a lecture hall type of space should be avoided.

Length of the Program. The instructors' feelings were mixed as to the length of the programs. One instructor felt that it was too short for the amount of remediation the students needed but realized that the students became tired because of its intensity. Her suggestion was to begin the program one year before the students had to take the MCAT and work through to the time that they took the MCAT. Another instructor shared this opinion, suggesting that the course be extended through the summer and into the fall since the exam is administered in October. One other instructor believed that the length was just right because it enabled him to present quite a lot of material without infringing upon the students' well deserved vacations.

Usefulness of Biweekly Staff Meetings and Training Workshops. It appears as if the instructors recognized the value of the meetings but two felt they were too frequent in number. They suggested having only two meetings: one early on in the program and one two thirds of the way through the program. One instructor believed that the training workshop at the beginning

of the program was too long. Another instructor felt that the biweekly meetings were too short, but she attributed this in part to the fact that the instructors all had very tight schedules and could not afford to spend much more time in the meetings.

Appropriateness of Materials. This seemed to vary with each subject.

Physic/Quant -	Flowers - excellent Barrons - fair Harcourt Bruce - good
Chemistry -	Flowers - excellent Barrons - fair
Biology -	All materials were good - needed a greater selection of sample questions.
Reading -	Would like more materials. "In some of the books the reading passages were too easy and in some books the reading passages were too one-sided." Her complaint was more with the lack of materials rather than the appropriateness of the materials.
Problem Solving -	Materials ranged from very easy problems to those with moderate difficulty.

Program Weakness. The only weaknesses identified by the instructors was the lack of continuity in scheduling some of the courses. For example: biology did not meet for two weeks at one point during the summer. One instructor complained about the lack of feedback on student progress during the course. She also felt that there was not enough time to go over problem sets together. Another instructor would like to have seen more advisement and better counseling.

Program Strengths. The strengths most often cited were the enthusiasm, eagerness, motivation and camaraderie of the students. The enthusiasm of the program staff and instructors was also seen as a strength.

Suggestions for Redesigning Phase Two.

- o Have more sessions spread more evenly throughout the summer so that each class meets at least once a week

- o Have two Phase Twos. The first would be a intensive eight week program; the second would be a testing program which offered progressively harder timed tests. No teaching would be done during this phase. The goal would be to teach them test taking techniques and to show them what they don't know so that they can teach themselves

Suggestions for Improving Staff Meetings and Workshops.

- o Make the meetings shorter and more efficient
- o Make the meetings longer so that instructors have more time to interact
- o Have only two staff meetings

Suggestions for Improving Teaching Materials.

- o Keep the materials up-to-date. As soon as there is a change in the type of question or knowledge required, the material should reflect this
- o In biology, a greater number of questions to choose from is necessary

Comments on Overall Program.

- o "This program was helpful to those students who were well trained to begin with. However many did not seem to make an effort."
- o Need to hire student tutors. This would have two purposes: students relate better to other students and students would get a good picture of the type of competition they are up against. Must guard against the students getting overly confident.
- o The students' helpful attitudes towards each other is what impressed one instructor.

Tutors' Evaluation--Washington, D.C.

Each of the tutors was requested to provide a narrative evaluation of the operational and administrative components of the program, including

student selection and preparedness, physical facilities, length of the program, usefulness of biweekly staff meetings and training workshops, appropriateness of teaching materials, and program strengths and weaknesses. Additionally, comments on the overall program were requested. The following summarizes those evaluations.

Student preparedness. The tutors noted that the degree of student preparedness depended on the subject area. Some students thought that the intervention program would provide sufficient coverage of the materials and they would not have to do any additional studying. Many of the students had startling gaps in their educational background, particularly in quantitative skills and mathematics, although they all had completed the basic undergraduate courses. None of the tutors, however, perceived this diversity as negative, but rather, as a motivation for all students to achieve the level of competence to enable them to progress in the program.

Student selection. The tutors expressed pleasure at the group of students who had been selected to participate in the program, noting that they were an excellent sample of young, ambitious people.

Physical facilities. With the exception of insufficient blackboard space, the facilities were rated excellent. One tutor noted that everything was provided from pencils and paper to coffee.

Length of the program. Generally, the tutors felt that the length of the program was good, although one suggested that it could have been extended for one to two weeks.

Program coordination and administration. All of the tutors commented that the coordination and administration of the program was excellent, citing its precision and organization as major strengths.

Usefulness of biweekly staff meetings. The tutors reported that these meetings provided the necessary feedback to them, augmented the training workshop, and were useful in detecting problems and reaching solutions.

Appropriateness of teaching materials. These materials were rated excellent by the instructors, one noting that xerox copies of the materials should be compiled into study guides.

Program weakness. The major weaknesses of the program as reported by the tutors was the lack of time to cover all materials they felt were necessary and the scheduling of classes in the evenings. One tutor noted that these classes were more tiring than are classes held during the day. A second tutor thought that field trips to area medical schools should have been incorporated to give the students a "feel" of what the life of a medical student really is.

Program strengths. The program adminstration was cited as a primary strength of the program, inaddition to the sense of camaraderie that developed between tutors, administrators, and students.

Comments on overall program. Overall, the tutors found the program to be well organized and would not object to participating should future programs be implemented. All felt that the program was designed only to improve students and all expressed regret that the program was terminating.

Appendix B

Publicity/Recrutiment Materials

TEST TAKING METHODS ••READING•••

SCHEDULE

November and December of 1982:

Administration of PMSAT

January of 1983:

Individual Counseling
(based on PMSAT scores)

February to April of 1983:

Phase One Tutorials
(consists of eight consecutive all-day Saturday classes in Reading, Problem solving and Quantitative skills)

June to August of 1983:

Phase Two Tutorials
(consists of eight five-day weeks of classes in all MCAT subject areas plus Phase One skills)

PARTICIPANTS' COMMENTS

"I feel that this program is very sucessful. I am glad to have participated in this tutorial program — my time was well spent."

"The program was excellent. It helped me to progress rapidly and to improve tremendously."

"The classes were taught by the most excellent and caring professors I have had in a long time."

CONDUCTED BY: EPRI
(Education Policy Research Institute).

Federal funding for this project was provided by FIPSE (Fund for the Improvement of Post-Secondary Education)

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minorities please apply

QUANTITATIVE SKILLS

BEST COPY AVAILABLE

MCAT?

FIND OUT WITH PMSAT

(PRE-MEDICAL STUDENT ACHIEVEMENT TEST)

Appendix C

Information Systems

EDUCATION POLICY RESEARCH INSTITUTE OF ETS

STUDENT INFORMATION QUESTIONNAIRE

Name: _____
First Middle Last

Mailing Adress: _____
Street City

_____
State Zip

Permanent Address: _____
(if different from above) Street City

_____
State Zip

Telephone Number(s): _____

Sex: (a) Male ____ My undergraduate school is:

(b) Female ____ _____

Please complete questions choosing the letter in parenthesis that best describes you or your situation.

1. I am: _____

(a) Black
(b) Hispanic
(c) Native American
(d) Asian American
(e) Non-minority

2. I am: _____

(a) married with no children
(b) married with child(ren)
(c) single
(d) single head of household

3. My undergraduate major is: _____

(a) biology
(b) chemistry
(c) physics
(d) mathematics
(e) other _____
(specify)

4. I am a:

(a) freshman
(b) sophomore
(c) junior
(d) senior
(e) college graduate
I graduated in _____

5. My overall grade point average is: _____

(a) 4.0 - 3.6
)b) 3.5 - 3.1
(c) 3.0 - 2.6
(d) 2.5 - 2.1
(e) 2.0 and below

6. My combined science and math GPA is: _____

7. My undergraduate school is: _____

(a) public
(b) private
(c) historically Black public
(d) historically Black private

I have taken the following college courses:

8. basic biology

(a) yes
(b) no

9. inorganic chemistry

(a) yes
(b) no

10. organic chemistry

(a) yes
(b) no

11. basic physics

(a) yes
(b) no

12. college physics

(a) yes
(b) no

13. Have you taken the New MCAT?

(a) yes
(b) no

14. If yes, when:

(a) fall '82
(b) spring '82
(c) fall '81
(d) other _____
(specify)
(e) not applicable

15. State of legal residence _____

16. My total New MCAT score was: _____

Please indicate if you have used or plan to use any of the following New MCAT preparation activities:

17. Tutorial programs

(a) yes
(b) no
(c) plan to use

18. Academic diagnostic testing

(a) yes
(b) no
(c) plan to use

19. Study skills classes or labs

(a) yes
(b) no
(c) plan to use

20. Commercial coaching such as Kaplan

(a) yes
(b) no
(c) plan to use

21. New MCAT study guidelines

(a) yes
(b) no
(c) plan to use

22. I grew up in an area that was: _____

(a) large city - inner city area
(b) large city - other city area
(c) suburban
(d) small town
(e) rural

23. My high school was located in: _____

(a) large city - inner city area
(b) large city - other city area
(c) suburban
(d) small town
(e) rural

24. My high school class was: _____

(a) predominantly non-minority
(b) predominantly minority

25. My mother's highest educational level was: _____

(a) some high school
(b) high school graduate and/or technical training
(c) some college
(d) college graduate
(e) graduate or professional school

26. My father's highest educational level was: _____

(a) some high school
(b) high school graduate and/or technical training
(c) some college
(d) college graduate
(e) graduate or professional school

27. My mother's occupation is (was): _____

(a) physician
(b) other health profession
(c) other profession; owner or manager
(d) clerical; sales; skilled worker
(e) unskilled worker, farmer or homemaker

28. My father's occupation is (was): _____

(a) physician
(b) other health profession
(c) other profession; owner or manager
(d) clerical; sales; skilled worker
(e) unskilled worker, farmer or homemaker

29. I am: _____

(a) not employed
(b) employed 0-7 hours per week
(c) employed 8-12 hours per week
(d) employed 13-20 hours per week
(e) employed more than 20 hours per week

30. My principal past (or present) employment has been: _____

(a) teaching or counseling (e.g. instructor, tutor, assistant, social worker)
(b) marketing (e.g. salesperson, advertising)
(c) health-related (e.g. nurse, nurses aide, orderly, ambulance driver)
(d) research or technical (e.g. lab technician, research assistant)
(e) labor (e.g. construction worker, driver, maintenance worker clerical)

31. My income (excluding financial aid) is: _____

(a) 0 - $9,999
(b) $10,000 - $14,999
(d) $15,000 - $19,999
(d) $20,000 - $24,999
(e) over $25,000

32. My family (parents or if married, spouse) income is: _____

(a) 0 - $9,999
(b) $10,000 - $14,999
(c) $15,000 - $19,999
(d) $20,000 - $24,999
(e) over $25,000

33. In my undergraduate studies, I: _____

(a) received no financial aid from sources other than myself and/or family
(b) received federal government aid
(c) received state government aid
(d) received scholarship aid

34. My loans for undergraduate studies totaled: _____

35. My biggest reason for deciding to study medicine was: _____

(a) my parents and/or other relatives advised me to
(b) my counselor or teacher suggested it
(c) my experience in a health-related setting influenced me
(d) my success in science influenced me
(e) my desire to help people could be fulfilled

36. I believe my chances of getting into medical school are: _____

(a) 0 - 30%
(b) 31 - 40%
(c) 41 - 50%
(d) 51 - 60%
(e) over 60%

37. My biggest problem in medical school will be: _____

(a) dealing with disease and death
(b) finding the money for tuition
(c) succeeding with the science curriculum
(d) dealing with the racial attitude of students
(e) dealing with the racial attitude of teachers

38. My next biggest problem in medical school will be: _____

(a) dealing with disease and death
(b) finding the money for tuition
(c) succeeding with the science curriculum
(d) dealing with the racial attitude of students
(e) dealing with the racial attitude of teachers

39. My greatest problem for medical school admission is the barrier created by: _____

(a) my need for financial aid
(b) my grade point average
(c) my New MCAT score
(d) my lack of knowledge of the admissions process
(e) my age

40. My next greatest problem for medical school admission is the barrier created by: _____

(a) my need for financial aid
(b) my grade point average
(c) my New MCAT score
(d) my lack of knowledge of the admissions process
(e) my age

41. What type of medicine do you wish to practice? _____

(a) surgery
(b) pediatrics
(c) internal medicine
(d) general and family practice
(e) other _____
(specify)

42. I am thinking of practicing: _____

(a) surgery
(b) pediatrics
(c) internal medicine
(d) general and family practice
(e) other _____
(specify)

Education Policy Research Institute of
Educational Testing Service

FUND FOR THE IMPROVEMENT OF POSTSECONDARY EDUCATION November 5, 1982

PROJECT DESCRIPTION FOR STUDENTS (TO ACCOMPANY WAIVER)

Education Policy Research Institute (EPRI) is conducting a program designed to improve minority performance on the New Medical College Admission Test (NEW MCAT).

Those minority students who are pursuing or anticipate careers in medical fields will be given the Pre-Medical School Assessment Test (PMSAT). This test approximates the NEW MCAT except in overall length. As part of the project, students will undergo a comprehensive program of evaluation and preparation for the NEW MCAT tailored to individual student needs, as expressed by their PMSAT scores. Activities include study skill training, learning the logic of test construction, how distractors are used, and strategies that will produce the most educated guessing. This project will offer students instruction in test-specific topics as well as test-taking skills.

Because the project expects to help produce a program of systematic aid to minorities in succeeding on standardized admissions tests, EPRI is interested in learning as much as possible about the relation of special preparation to better test performance. We ask your cooperation in providing certain background and school experience information. Of course, all such information will be held in strictest confidence and used exclusively for this project. In conducting evaluations of this project, no identifying data on students will be revealed.

Please sign the waiver on the reverse side of this sheet and return it to EPRI.

C O N T R A C T

I, the undersigned, agree to abide by the following conditions of this contract upon my acceptance into the Educational Testing Services's Summer Program (Phase II):

1. I will attend class regularly. I understand that missing two class sessions of Biology, Chemistry, Physics or Reading; or four class sessions of Quantitative Analysis/Problem Solving will result in my dismissal from the program. (Attendance will be taken at all sessions.)

2. I will get to class on time. (The building is locked at 6:00 p.m. Students arriving late will not be able to get into the building unless they call in ahead of time.)

3. I will take the pre-test (May 28, 1983) and the post-test (August 14, 1983) administered by the program.

4. I will make my MCAT scores available to the Educational Testing Service after I take the MCAT in October 1983 or April 1984.

It is understood that the purpose of my attending the summer program is to improve my scores on the MCAT. I intend to take the fullest advantage of the instruction and assistance made available to me by this program by working hard and attending regularly.

_____
(signed)

_____
please print name

Soc. Sec. No.

Date:

STUDENT EVALUATION
(Phase Two, Year Two)

_____
Name of Student

Please evaluate the student in terms of the following characteristics.

1. Motivation

2. Perseverance

3. Progress (measured in terms of preparedness at beginning of program compared to present ability, test scores, etc.)

5. Participation in class

6. Attendance

7. Comments

MCAT PREPARATION PROGRAM
PHASE TWO TUTOR'S EVALUATION
Summer 1983

Please provide a narrative evaluation of each element of Phase Two listed below.

1. Student preparedness

2. Student selection

3. Physical facilities

4. Length of program

5. Program coordination/administration

6. Usefulness of bi-weekly staff meetings and training workshops.

Appropriateness of teaching/study materials.

3. Program weaknesses.

MCAT Tutorial Program
Phase II Student Evaluation
Summer 1983

Please answer all questions by placing an "X" in the most appropriate response or providing narrative comments where indicated. Your candor in this evaluation will be useful as we examine the degree to which we have achieved our purpose--to provide tutorial and enrichment services to students preparing for the MCAT--and met your specific needs.

This evaluation need not be signed or in any way indicate the identity of the respondent.

Thank you.

9). Approximately how many hours per week of study outside the classroom did you require to keep up with the class lectures?

Biology_____
Chemistry_____
Physics_____
Quant_____
Reading_____
Problem Solving_____

10). Was the location of the program

_____ convenient _____ inconvenient _____ don't know

11). Were the facilities

_____ adequate _____ inadequate _____ don't know

12). Please rate the simulated MCAT exams and weekly quizzes in terms of the following.

	Weekly Quizzes			Simulated MCAT		
	helpful	not helpful	unsure	helpful	not helpful	unsure
a). indicator of subject knowledge						
b). indicator of progress						
c). practice for taking the MCAT						

13) Should _____ more simulated exams or _____ fewer simulated exams have been offered .(Please explain your response)

II. Program Tutors/Instructional Material — Chemistry

1. Did the tutor know the subject material?
___yes ___don't know ___no

2. Was her presentation clear?

___yes ___don't know ___no

3. Did she use?

___too many examples ___not enough examples ___an adequate number of examples

4. Did she cover

___not enough material ___too much material ___an adequate amount of material

5. What areas within the subject weren't covered that you feel should have been to provide adequate preparation for the MCAT?

6. Was the instructional material

___too easy ___too advanced ___just right

7. Did she pace the presentation of new materials

___too fast ___just right ___too slow

8. Was the tutor

___usually accessible ___always accessible ___rarely accessible ___almost never accessible

9. Were the homework assignments

___too advanced ___too easy ___just right

10. Could you complete the homework

___alone ___needed outside help ___didn't do the homework

11. Would you have preferred

___more timed tests ___fewer timed tests ___no change

12. What was her ability to communicate with the students

___poor ___fair ___good ___excellent

II. Program Tutors/Instructional Material -- Biology

1. Did the tutor know the subject material?
   ____yes ____don't know ____no

2. Was her presentation clear?

   ____yes ____don't know ____no

3. Did she use?

   ____too many examples ____not enough examples ____an adequate number of examples

4. Did she cover

   ____not enough material ____too much material ____an adequate amount of material

5. What areas within the subject weren't covered that you feel should have been to provide adequate preparation for the MCAT?

6. Was the instructional material

   ____too easy ____too advanced ____just right

7. Did she pace the presentation of new materials

   ____too fast ____just right ____too slow

8. Was the tutor

   ____usually accessible ____always accessible ____rarely accessible ____almost never accessible

9. Were the homework assignments

   ____too advanced ____too easy ____just right

10. Could you complete the homework

    ____alone ____needed outside help ____didn't do the homework

11. Would you have preferred

    ____more timed tests ____fewer timed tests ____no change

12. What was her ability to communicate with the students?

    ____poor ____fair ____good ____excellent

II. Program Tutors/Instructional Material -- Reading

1. Did the tutor know the subject material?
___yes ___don't know ___no

2. Was her presentation clear?

___yes ___don't know ___no

3. Did she use?

___too many examples ___not enough examples ___an adequate number of examples

4. Did she cover

___not enough material ___too much material ___an adequate amount of material

5. What areas within the subject weren't covered that you feel should have been to provide adequate preparation for the MCAT?

6. Was the instructional material

___too easy ___too advanced ___just right

7. Did she pace the presentation of new materials

___too fast ___just right ___too slow

8. Was the tutor

___usually accessible ___always accessible ___rarely accessible ___almost never accessible

9. Were the homework assignments

___too advanced ___too easy ___just right

10. Could you complete the homework

___alone ___needed outside help ___didn't do the homework

11. Would you have preferred

___more timed tests ___fewer timed tests ___no change

12. What was her ability to communicate with the students?

___poor ___fair ___good ___excellent

II. Program Tutors/Instructional Material -- Physics

1. Did the tutor know the subject material?
____yes ____don't know ____no

2. Was his presentation clear?

____yes ____don't know ____no

3. Did he use?

____too many examples ____not enough examples ____an adequate number of examples

4. Did he cover

____not enough material ____too much material ____an adequate amount of material

5. What areas within the subject weren't covered that you feel should have been to provide adequate preparation for the MCAT?

6. Was the instructional material

____too easy ____too advanced ____just right

7. Did he pace the presentation of new materials

____too fast ____just right ____too slow

8. Was the tutor

____usually accessible ____always accessible ____rarely accessible ____almost never accessible

9. Were the homework assignments

____too advanced ____too easy ____just right

10. Could you ccmplete the homework

____alone ____needed outside help ____didn't do the homework

11. Would you have preferred

____more timed tests ____fewer timed tests ____no change

12. What was his ability to communicate with the students?

____poor ____fair ____good ____excellent

II. Program Tutors/Instructional Material -- Problem Solving

1. Did the tutor know the subject material?
____yes ____don't know ____no

2. Was his presentation clear?

____yes ____don't know ____no

3. Did he use?

____too many examples ____not enough examples ____an adequate number of examples

4. Did he cover

____not enough material ____too much material ____an adequate amount of material

5. What areas within the subject weren't covered that you feel should have been to provide adequate preparation for the MCAT?

6. Was the instructional material

____too easy ____too advanced ____just right

7. Did he pace the presentation of new materials

____too fast ____just right ____too slow

8. Was the tutor

____usually accessible ____always accessible ____rarely accessible ____almost never accessible

9. Were the homework assignments

____too advanced ____too easy ____just right

10. Could you complete the homework

____alone ____needed outside help ____didn't do the homework

11. Would you have preferred

____more timed tests ____fewer timed tests ____no change

12. What was his ability to communicate with the students?

____poor ____fair ____good ____excellent

II. Program Tutors/Instructional Material — Quant

1. Did the tutor know the subject material?
____yes ____don't know ____no

2. Was his presentation clear?

____yes ____don't know ____no

3. Did he use?

____too many examples ____not enough examples ____an adequate number of examples

4. Did he cover

____not enough material ____too much material ____an adequate amount of material

5. What areas within the subject weren't covered that you feel should have been to provide adequate preparation for the MCAT?

6. Was the instructional material

____too easy ____too advanced ____just right

7. Did he pace the presentation of new materials

____too fast ____just right ____too slow

8. Was the tutor

____usually accessible ____always accessible ____rarely accessible ____almost never accessible

9. Were the homework assignments

____too advanced ____too easy ____just right

10. Could you complete the homework

____alone ____needed outside help ____didn't do the homework

11. Would you have preferred

____more timed tests ____fewer timed tests ____no change

12. What was his ability to communicate with the students?

____poor ____fair ____good ____excellent

II. Program Tutors/Instructional Material -- Writing

1. Did the tutor know the subject material?
____yes ____don't know ____no

2. Was her presentation clear?

____yes ____don't know ____no

3. Did she use?

____too many examples ____not enough examples ____an adequate number of examples

4. Did she cover

____not enough material ____too much material ____an adequate amount of material

5. What areas within the subject weren't covered that you feel should have been to provide adequate preparation for completing the AMCAS essay?

6. Was the instructional material

____too easy ____too advanced ____just right

7. Did she pace the presentation of new materials

____too fast ____just right ____too slow

8. Was the tutor

____usually accessible ____always accessible ____rarely accessible ____almost never accessible

9. Were the homework assignments

____too advanced ____too easy ____just right

10. Could you complete the homework

____alone ____needed outside help ____didn't do the homework

11. What was her ability to communicate with the students?

____poor ____fair ____good ____excellent

III. Please use the space below for any additional comments or criticisms of the program.